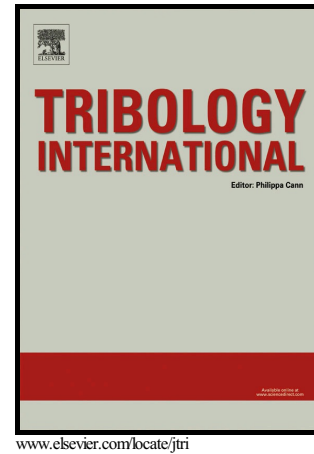


Author's Accepted Manuscript

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PII: S0301-679X(16)30381-4
DOI: <http://dx.doi.org/10.1016/j.triboint.2016.10.020>
Reference: JTRI4410

To appear in: *Tribology International*

Received date: 17 June 2016
Revised date: 4 October 2016
Accepted date: 13 October 2016

Cite this article as: S.M. O'Halloran, P.H. Shipway, A.D. Connaire, S.B. Leen and A.M. Harte, A combined wear-fatigue design methodology for fretting in the pressure armour layer of flexible marine risers, *Tribology International* <http://dx.doi.org/10.1016/j.triboint.2016.10.020>

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A combined wear-fatigue design methodology for fretting in the pressure armour layer of flexible marine risers

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Abstract

This paper presents a combined experimental and computational methodology for fretting wear-fatigue prediction of pressure armour wire in flexible marine risers. Fretting wear, friction and fatigue parameters of pressure armour material have been characterised experimentally. A combined fretting wear-fatigue finite element model has been developed using an adaptive meshing technique and the effect of bending-induced tangential slip has been characterised. It has been shown that a surface damage parameter combined with a multiaxial fatigue parameter can accurately predict the beneficial effect of fretting wear on fatigue predictions. This provides a computationally efficient design tool for fretting in the pressure armour layer of flexible marine risers.

Keywords: Fretting wear, fretting crack initiation, fretting life prediction, flexible risers, pressure armour wire

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